

CHROMOSOME STUDIES AND TAXONOMIC CONSIDERATIONS IN
ACILEPIDOPSIS (VERNONIEAE, ASTERACEAE)

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ABSTRACT

Chromosome number and karyotype are reported for the first time in *Acilepidopsis echitifolia* (Mart. ex DC.) H. Rob. The species presents a somatic chromosome number of $2n=8x=72$, with the karyotype composed of 46 metacentric, 16 submetacentric and 10 subtelocentric-acrocentric chromosomes. At meiosis, *A. echitifolia* always shows 36 bivalents, interpreted here as an allopolyploid based on $x=9$. The basic number found in *Acilepidopsis* supports its generic status and suggests a clear relationship with members of Vernonieae from the Eastern Hemisphere.

KEY WORDS: Asteraceae, Vernonieae, *Acilepidopsis*, pollen, chromosomes, relationships

Acilepidopsis H. Rob. has been recently removed from the American *Vernonia* on the basis of the pollen, glands, stem base, and style type (Robinson 1989, 1990). The genus contains a single species, *A. echitifolia* (Mart. ex DC.) H. Rob., which lives in moist soils from northern Argentina, Bolivia, Paraguay, and southern Brazil.

The pollen of *Acilepidopsis* is triporate, lophate, entirely covered of similar sized areoles, with smooth crests of the muri lacking a perforated tectum (Figure 1). Such pollen has been called type "E" by Jones (1981) and is present in many species of the Eastern Hemisphere. On the other hand, most American taxa have tricolporate pollen, with several different types named A, B, C, and D (Jones 1979a).

The pollen morphology of *Acilepidopsis echitifolia* has suggested that it would be more closely related to Old World members placed in *Vernonia* Schreb. than to other American taxa. Robinson (1989), in the original description of the genus, considered that cytological and chemical data could confirm the relationship of *A. echitifolia* to African members of Vernonieae. From the cytological viewpoint, the species of both

hemispheres may be distinguished primarily on the basic chromosome number. Old World taxa present $x=9$ and $x=10$, while the American entities mainly have a base number $x=17$ (Jones 1979b), although have been also reported $x=16$, $x=15$, $x=14$, and $x=10$ (Dematteis 1997).

In the present study the somatic and meiotic chromosomes of *Acilepidopsis echitifolia* are analyzed for the first time. The results are discussed in relation to its taxonomic position and relationships.

Chromosome preparations were obtained following the methodology suggested by Dematteis (1997). Nomenclature used for the karyotype description is that proposed in Levan *et al.* (1964). The origin of the plants examined is: PARAGUAY. Dept. Amambay: 30 km N of route 5, on the road to Bella Vista, *M. Dematteis & A. Schinini* 872. Voucher specimens have been deposited in the herbarium of the Instituto de Botánica del Nordeste (CTES).

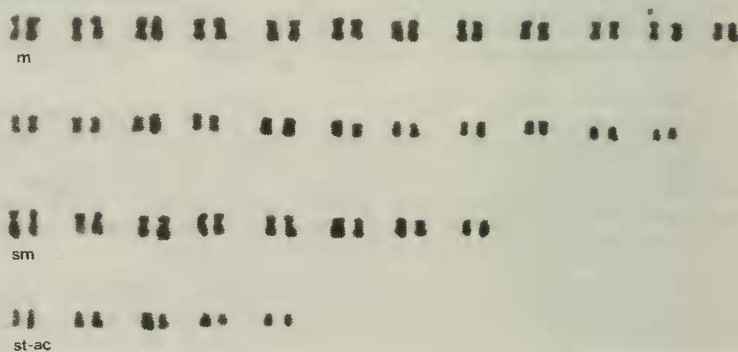
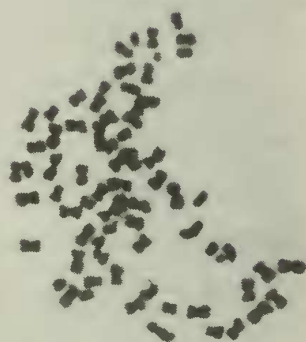
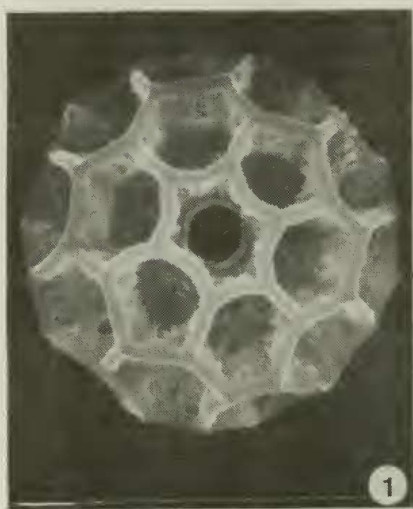
Acilepidopsis echitifolia was found to be octoploid with $2n=72$ (Figure 2). The karyotype was composed of 46 metacentric (m), 16 submetacentric (sm), and 10 subtelocentric-acrocentric (st-ac) chromosomes (Figure 3). Chromosome size ranged from 1.17 to 2.55 μm , with a mean length of 1.81 μm . Total karyotype length was 130.58 μm . The satellite was observed in the short arm of the metacentric pair N° 11 (Figure 3). At meiosis, *A. echitifolia* showed a regular behaviour, forming invariably 36 bivalents. According to this observation, *A. echitifolia* would likely be an allopolyploid species.

The basic chromosome number $x=9$ found in *Acilepidopsis* supports its generic status and a probable close relationship with African taxa, in which this number is the more frequent. However, in contrast to the latter, *A. echitifolia* possesses a relatively high ploidy level ($8x$). In Old World species, polyploidy is uncommon, and only tetraploids and hexaploids have been reported (Jones 1979b).

Acilepidopsis echitifolia presents a comparatively large number of subtelocentric-acrocentric chromosomes. This feature clearly separates *Acilepidopsis* from other American genera of Vernonieae, such as *Lessingianthus* H. Rob., *Lepidaploa* (Cass.) Cass., and *Vernonanthura* H. Rob., which in majority have metacentric and submetacentric pairs (Dematteis & Fernández 1998). The subtelocentric chromosomes seem to be exceptional in these groups, and when present, the number of pairs is always lower than in *Acilepidopsis*.

In addition to the chromosomal information, chemical data available for the tribe also support the generic status of *Acilepidopsis*, since it is the only member of Vernonieae yet known to have lignans (Bohlmann *et al.* 1981).

The basic number $x=9$ has not been previously reported for any American entity. However, it may be expected in other New World groups having type "E" pollen, because there is an evident relationship between pollen morphology and chromosome number (Robinson 1992a). The genera with tricolporate pollen show basic chromosome numbers $x=17$, $x=16$, $x=15$, and $x=14$. The genera that possess triplicate pollen types have base numbers $x=8$, $x=9$, $x=10$, $x=11$, and $x=13$. The two other genera that may have $x=9$ are *Mesanthophora* H. Rob. and *Pacourina* Aubl., which are the other American groups with type "E" pollen.



Figures 1-3. *Acilepidopsis echitifolia*. 1. Pollen grain, view showing pore. 2. Somatic chromosomes, $2n=72$. 3. Karyotype, $46m + 16sm + 10st-ac$. Scale= $5\mu m$.

Acilepidopsis may be more closely related to *Mesanthophora*, a monotypic genus described for Paraguay (Robinson 1992b) and since discovered in Bolivia. Despite the identical pollen type, the genera differ considerably in many other morphological features. *Acilepidopsis* is a pubescent plant covered with reddish glands, has sessile heads, 8-13 flowered, placed in the axils of leafy branches; meanwhile, *Mesanthophora* is a glabrous plant with pedunculate, 90-100 flowered heads, located in a supra-axillary position.

A particular feature noticed in *Acilepidopsis* since its description is the unusual sclerified pointed base of the anther thecae, which is otherwise known in the more distantly related *Piptocarpha* ($x=17$).

Additional chromosome studies, especially in genera with triporate pollen, could provide a better understanding of the relationships between *Acilepidopsis* and other American and African genera of Vernonieae.

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